

# Relationship Between Loans And Deposits Of Rural Branches Of Banks In Nigeria (1982-2012): Cointegration And Vecm Approach

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**Abstract:** *This paper investigates the relationship between loans and deposits in the rural areas and its impact on the rural development: cointegration and VECM approach. Cointegration was used to assess the causality relationship. The results revealed that loans and deposits are cointegrated, the VECM shows that long-run relationship exist between loans and deposits, but deposits have no short-run effect on loans. Bidirectional causality runs from loans to deposits and deposits to loans, this implies that they are indicators of development and economic growth of the rural dwellers. As such this should be properly managed and improved for the betterment of their living standard which will in turn improve the nation's economy. The study recommends that commercial banks and agricultural development should be encourage to set-up structure in the rural areas so as to promote small scale enterprises; rural dwellers should be educated and motivated to make deposits with these banks so as to create a better capital base.*

**Keywords:** *Economy, Relationship, Rural, Bank*

## I. INTRODUCTION

The banking sector in Nigeria and its counterpart in other part of the world play the significant role of mobilizing financial resources from surplus units and channelling same to meet the investment needs of the deficit units of the economy. Prior to the advent of the Structural Adjustment Programme (SAP) of 1986, majority of banks were operating profitability at near complacent level as competition among them was more of the cooperating type. The SAP changed both the structure and content of the banking business. The number of banks not only grew tremendously in effect, but the techniques of banking services and the range of products and services in the market have also changed in the same dimension.

Rural branches of banking services was introduced with the aim of bringing economic development to the doorstep of the local populace as they constitute about 70 percent of the population and endured with great economic potentials. A review of the rural branches of banking scheme shows that the basic philosophy of the rural branches of banking scheme is to mobilize rural savings for the issuance of credit to the rural dwellers. The re-thinking of this was carried out by the Central

Bank of Nigeria (CBN) which shouldered the banking needs of the rural communities, particularly the farmers and small scale entrepreneurs. The Central Bank of Nigeria (CBN) has in respect to this need taken easiest way out by imposing rural branches banking programme on the established urban banks under certain criteria some of which are:

- ✓ That such towns or villages must have established institution such as schools and health care facilities.
- ✓ That population range is used to determine the number of communities that require branches.
- ✓ That such area was experiencing considerable economic activities.

Since the inception of banking in the rural area, there have been incessant fluctuations in the amount of deposits and loans which have an effect on the local economy, judging from the fact that the rural population accounts for a reasonable percentage of the total national population.

Community and Agriculture and development bank is one arm of banking that caters for the rural banking needs, development and services. Community banking is purely setup for the development of the rural area. It's a self-sustained financial institution owned and managed by the community or

group of communities to render financial services to the host community.

They provide credit to the rural dwellers to finance programmes such as foods produce, roads and rural infrastructure. However, rural development has been retarded from experience due to scarcity of restrictive access to loan able funds.

Governments in an attempt to solve these problems, economic policies were geared towards development of banking and rural setting of branches of banking of the orthodox banks. The mode of operation of the conventional banks in terms of sophistication, legalistic existence of collateral and their coverage limitation makes them inadequate to match the un-sophistication of the rural communities. Cultivating banking habit, granting loans to rural dwellers and small scale businessmen has been a major problem to most banks in Nigeria. This is due low level of awareness regarding lending as most of them after taking the loans will buy things like television, generators or marry wives and repayment is usually becoming big challenge.

## REVIEW OF LITERATURE

From the records of deposits and loans, one can see that the figure is fluctuating for instance from 1982 – 1990, there has been an increase, and then followed by a decrease in 1991, there is outstanding increase in the following year and so on.

The location pattern of banks in Nigeria weighed significantly in favour of the urban areas to neglect the rural areas, which have been known to inhabit the large proportion of people in Nigeria (Olajide, 1995). Writing on the roles of rural banking scheme in rural industrialization, Fabayo (1987) argues that the roles of rural branches of banking includes; provision of rural lending to farmers and enabling rural entrepreneurs and dwellers to cultivate the desired banking habits. Rural banking is therefore said to become a strategy which is potentially capable of helping to transform the rural communities in developing countries.

A cursory look at the first set of indigenous banks revealed that they their branches opened in big cities; the same was followed by other banks that sprang up later in Nigeria. These big cities attracted a large number of banks because of the existence of many customers and also because of their high level of business activities to the detriment of the rural areas which houses large portion of the population.

Federal Government in 1977 through CBN formulates a policy called the rural banking programme of 1977 in (Umole, 1988); mandating all commercial banks in the country to go rural with their banking business, the objectives of the policy of the Federal Government which CBN was expected to pursue with regard to rural banking process amongst others include:

- ✓ Encouragement of cultivation of banking habits among rural dwellers.
- ✓ Mobilization of savings from rural areas for the purpose of channelling same to the development of rural areas which could be achieved by establishing a diffused network of branches to all parts of the federation in order to enhance rapid and balanced development of the economy.

- ✓ Creation of credits by way of equity and loan for small scale industries and entrepreneurs.
- ✓ Reduction of migration from rural to urban centres by providing employment avenues to the rural dwellers.

Development of rural branches of banking in Nigeria cannot be over emphasized; the first phase of the rural branches of banking scheme (1977 – 1980) was completed in June 1980 which was followed by the commencement of the second phase (1980 – 1983) in August 1980.

Under the first phase, 200 rural centres were identified and allocated to the commercial banks for the opening of bank branches. In identifying the centres for this stage, priority consideration were given to local government headquarters so as to ensure that each local government headquarter have at least a branch. The allocation of centres to commercial banks took in to consideration the extent of involvement of each bank in the rural branches of banking. Those banks that were already actively operating in rural branches were allocated fewer centres, while others that are concentrated in urban areas were allocated many branches; the aim was to equalize the ratio of the various banks.

The 200 branches allocated to the banks during the first phase were opened by the end of June, 1980 (CBN 1988). Under the second phase, 266 branches were allocated to the banks, allocation was based on relative sizes and network of the branches, emphasis was shifted from local government headquarters to other major rural villages and towns. The second phase was completed by the end of December, 1983. Out of the projected 266 branches, 258 were opened; the remaining 8 were shifted to the third phase.

In the third phase that started in August 1985, the number of commercial bank branches in rural areas was 766 with the total number actually opened at 602 leaving a balance of 164 as at 1994 and also according to CBN, commercial banks currently serve about 20 million client through a network of more than 5000 branches.

The effect of banks on rural economy is significant, and an insight into it is a task worth taking. The banks in the rural area have greatly mobilized finance from the traditional sources to the modern institutionalized sources Joshua (1992). Mobilization and tapping of financial resources have led to a rise in saving and current accounts balance (all and deposits) of the banks in rural areas. Mobilization and industrialization of the rural area, being some of the objective of the scheme are therefore close to being delivered. The development of banking habits in rural areas have been improving gradually as witnessed in the rising figure of rural banks over the years, thus rural banking has extended banking services to rural communities and has assisted in cultivating and developing banking habits in rural areas have been improving gradually as witnessed in the rising figure of rural banks over the years, thus rural banking has extended banking services to rural communities and has assisted in cultivating and development banking habits among rural dwellers in Nigeria.

Furthermore, rural banking programme has generated a high degree of awareness of the importance of banking in rural areas. The programme has also succeeded in the provision of gainful employment to rural dwellers. The trend in itself has no doubt brought about an increase in the bank to person ratio.

Osayameh (1986), posited that the amount of credit out-reach is usually determined by the amount of deposit a bank can mobilize. Rural finance forgotten is almost, because there was no policy formulated to encourage rural bank deposits in most places (Vogel 1984).

Paulson and Me Andrews (1998) identified three types of deposits accounts, this includes pass book/ saving account which earns interest for the holder, current/ deposit account which is usually used for business, holders enjoy overdraft and withdrawal is through cheque books while time or fixed deposits enjoy interest payment according to the length of time. These types of savings are among the various deposits mobilization methods open to a bank.

Bascom (1952), opined that rural banks could also mobilize deposits by harnessing the rotational and non-rotational credit associations' scheme of rural people by linking them directly to the rural banks. This he argued would improve deposit base of rural banks and also expand their credit outreach.

Paulson and Me Andrews (1998) posited that it allows rural people to safe guard their money and accumulate funds that could be used for productive investments such as working capital that could enables clients to earn a stream of profits which are capable of translating into economic growth and development of rural areas. Besides, it was also argued that deposits improve financial intermediation by providing source of funds for rural bank to improve their credit outreach, (see also Porter 1996, and Yaron, et al 1997). Citing cases where rural banks credits have improved rural areas growth, Binswanger and Khandker (1993) reported that India rural banks credits have removed severe constraints in their rural financial markets, which have led to significant rural financial deepening which had a high trade off in rural growth, employment, and welfare of the rural people. Also, the Grameen Bank in rural areas of Bangladesh has assisted in mobilizing deposits from the people, which are used to better their lots.

However only a little percentage of the total deposits in Nigeria is mobilized in the rural areas and the something goes for credit. For instance, in Table 1 between the year 1982 and 2002, none of the annual rural deposits exceeded 25% of the total deposits mobilized by commercial banks in the country. The reason for this low deposit might be because majority of the rural dwellers earn income in the informal sector, which is entirely cash-based and they fall outside the segment of the population courted by banks. Besides, there is no policy currently in the country that encourages deposits and deposit mobilization in rural areas (Adeniyi)

Commerical Bank Total Deposits <sup>a</sup>	Rural Bank Deposits <sup>b</sup>	Ratio <sup>c</sup>
12018.90	111.70	0.92
13938.50	131.20	0.94
15734.80	276.60	1.76
17597.10	311.40	1.77
18137.60	873.50	4.82
23086.70	1229.20	5.32

29065.10	1378.40	4.71
27164.10	5722.70	21.06
38777.30 <sup>V</sup>	8360.10	21.56
53208.70	10580.70	19.88
75047.70	4612.20	6.15
110453.60	19542.30	17.69
142537.50	4855.30	3.41
178962.10	8807.10	4.92

1996	214359.80	12442.00	5.80
1997	280028.70	19047.60	6.80
1998	314303.50	18513.80	5.87
1999	476350.90	15860.50	3.33
2000	702104.50	20640.90	2.94
2001	928326.90	16872.90	1.82
2002	1100710.30	14861.60	1.35
2003	1417069.00	65552.30	4.63
2004	1778713.00	64490.00	3.63

Source: a and b, CBN Statistical Bulletin (2004) and c author's computation.

Table 2: Deposits and Loans of Rural Banks in Nigeria.(= N = Million )

Year	Deposits	Loans	Ratio
1982	111.70	35.90	32.10
1983	131.20	44.20	33.70
1984	276.60	58.20	21.00
1985	311.40	114.90	36.90
1986	873.50	373.60	42.77
1987	1229.20	492.80	40.10
1988	1378.40	659.90	47.90
1989	5722.00	3721.10	65.00
1990	8360.10	4730.80	56.60
1991	10580.70	5962.10	56.30
1992	4612.20	1895.30	41.10
1993	19542.30	10910.40	55.80
1994	4855.20	1602.20	33.00
1995	8807.10	8659.30	98.30
1996	12442.00	4411.20	35.50
1997	19047.60	11158.60	58.60
1998	18513.80	11852.70	64.02
1999	15860.50	7498.10	47.28
2000	20640.90	11150.30	54.00
2001	16875.90	12341.00	73.10
2002	14861.60	8942.20	60.20
2003	65552.30	11251.90	54.70
2004	64490.00	34118.50	52.90

Source: CBN Statistical Bulletin (2004)

## II. MATERIALS AND METHODOLOGY

The method of analysis used in this research is the time series modeling a long-run cointegration and VECM approach. The data use in this study was obtain from Central Bank of Nigeria (CBN) Statistical Bulletin for 30 years (1982-2012)the variables are deposit and loans which are non-stationary at levels as the case with most economic time series data, but transformed by differencing to achieve stationarity before modeling. Economic variable often suggest that long run relation may exist between certain pairs of economic or financial variables (Egon et.al, 2009). Many of these economic variables appear to be I(1) i.e. contain unit root meaning there are non-stationary. The variables tend to diverge as the time increases, because their unconditional variances are proportional to the time it is however possible for two variable to be I(1) and get a certain linear combination of these variables to be I(0), though at their individual state never obey any sort of long run relationship.

## A. ENGLE AND GRANGER TEST OF COINTEGRATION

Eugle and Granger (1987) formulated the test of cointegration, which is very easy to apply. This is first initiated by setting and estimating the co integrating regression equation

$$Y_{it} = \alpha_1 + \alpha_2 Y_{2t} + \dots + \alpha_p Y_{pt} + \varepsilon_t \dots \dots (1)$$

When p is the number of variables available in the modal

Note: the variables are assume to be I(1) and stationarity is possible after cointegration, leading to stationary residual terms.

$$\varepsilon_t = Y_{it} - \alpha_1 - \alpha_2 Y_{2t} - \dots - \alpha_p Y_{pt} \dots \dots (2)$$

From (2) the variables possess common trend and stationary relationship in the long run. The parameters (estimated) are the exact and the residuals as an error correction term in the Error Correction Model (EMC).

Again, there is the need to perform a unit root test on the residuals of the cointegrating equation implemented by Augmented Dickey further test

$$\Delta \mu_t = \alpha + \gamma \mu_t + \sum_{i=1}^k \delta \mu_{t-i} + v_t$$

taking into consideration that there is no cointegrating relationship I(1) and that the parameters are zero in the long run a significant  $\gamma$  indicates cointegration; and otherwise

## B. JOHANSEN TEST OF COINTEGRATION

The test is established by selting VAR representation of the variable

$$\beta_k(L)X_t = \mu_o + \varphi \Delta_t + \varepsilon_t$$

The system is assumed to be integrated of order I (1), if any of the variables is I (2) it must be transformed into I (1) before VAR is established( Johansen, 1991).

The VAR can be transformed into VECM using the difference operator as follows:

$$\Delta X_t = \Gamma_t \Delta X_{t-1} + \dots \Gamma_{k-1} \Delta X_{t-k-1} \pi x_{t-1} + \varphi \Delta_t + \varepsilon_t$$

where  $\Gamma$  and  $\Pi$  are matrixes of variables. The lag length is k and taken on each variable

VECM can be expressed into a more component form as

$$\Delta X_t = \sum_{i=1}^{k-i} \Gamma_i \Delta X_{t-i} + \Pi X_{t-1} + \mu_o + \varphi \Delta_t + \varepsilon_t$$

Here the number of stationary variable is directly proportional to the number of stationary relationship in the  $\Pi$  matrix, and if no cointegration exist all the rows in  $\Pi$  will be zero, while some are non zero if cointegration relationship exist.

## C. CAUSALITY

Granger (1969) was the first to proposed causality which seeks to examine whether the inclusion of both current and lagged values of  $X_t$  into the model alongside all other information available will improve in the forecasting of it. This is an attempt to avoid spurious regression between  $X_t$

and  $Y_t$  in case  $X_t$  has no impact on  $Y_t$  and  $Y_t$  depends on  $Y_{t-1}$  which are not capture in the regression model; the risk of spurious regression minimized within both the dependent and independent variables are considered; implying that the series is being fitted.

## D. GRANGER CAUSALITY TEST

Direct causality method will be employed which one of two the methods was proposed by freeman (1983). This assesses the causality relationship by setting a regression equation based on the lagged values as follows:

$$Y_t = \beta_o + \sum_{i=1}^j \beta_j Y_{t-i} + \sum_{k=1}^k \delta_k X_{t-k} + \mu_t$$

$$X_t = \alpha_o + \sum_{i=1}^j \alpha_j X_{t-i} + \sum_{k=1}^k \theta_k Y_{t-k} + v_t$$

Where  $X_t$  and  $Y_t$  are the variables, the uncorrelated error terms t is time and y is lag number

## E. EMPIRICAL RESULTS

Variables	Level		First Difference	
	ADF test Stat	Critical Values (1)%	ADF Test Stat	Critical Values (1)%
Deposits	-3.265332	-3.689194	-6.735960	-3.699871
Loans	0.916365	-3.724070	-6.428850	-3.724070

Table 1: Unit Roots Tests

The table above presents the result of the test of unit root among the variables.

Hypothesized No. of CE(s)	Eigenvalue	Trace Test Stat	P-value
None	0.561706	23.90454	0.0022
Atmost 1	0.090209	2.458056	0.1169

Table 2 Johansen Cointegration Tests

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level  
\* denotes rejection of the hypothesis at the 0.05 level  
\*\*MacKinnon-Haug-Michelis (1999) p-values

Loans	Deposits
1.000000	-0.944366(0.15239)

Table 3: Normalized Cointegrating Coefficients (Cointegrating Equation)

This presents the coefficients for the cointegrating equation

Null Hypothesis:	Obs	F-Statistic	Prob.
LOANS does not Granger Cause DEPOSITS	25	3.38543	0.0346
DEPOSITS does not Granger Cause LOANS		4.51826	0.0124

Table 4: Granger Causality Tests

$$D(\text{LOANS}) = C(1) * (\text{LOANS}(-1) - 0.944365918031 * \text{DEPOSITS}(-1) + 470.360515712) + C(2) * D(\text{LOANS}(-1)) + C(3) * D(\text{LOANS}(-2)) + C(4) * D(\text{DEPOSITS}(-1)) + C(5) * D(\text{DEPOSITS}(-2)) + C(6)$$

Coefficient	Std. Error	t-Statistic	Prob.
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C(1)	-0.512453	0.234500	-2.185297	0.0409
C(2)	-0.240474	0.333124	-0.721875	0.4787
C(3)	0.570421	0.582419	0.979401	0.3391
C(4)	-0.404375	0.213782	-1.891524	0.0731
C(5)	-0.619344	0.310065	-1.997467	0.0596
C(6)	124.5034	1909.679	0.065196	0.9487
R-squared	0.484772	Mean dependent var	634.5308	
Adjusted R-squared	0.355966	S.D. dependent var	10201.99	
S.E. of regression	8187.275	Akaike info criterion	21.05772	
Sum squared resid	1.34E+09	Schwarz criterion	21.34805	
Log likelihood	-267.7504	Hannan-Quinn criter.	21.14133	
F-statistic	3.763561	Durbin-Watson stat	2.698001	
Prob(F-statistic)	0.014529			

Table 5: Vecm

Test Statistic	Value	Df	Probability
F-statistic	2.118931	(3, 20)	0.1298
Chi-square	6.356794	3	0.0955

Null Hypothesis: C(4)=C(5)=C(6)=0

Table 6: Wald Test

TESTS	VALUES	P-VALUES
Breusch-Godfrey Serial Correlation LM	14.69080	0.0002
Breusch-Pagan-Godfrey Heteroskedasticity	0.585396	0.7378
Jarque-Bera Normality	17.89216	0.00013
Q-Statistic	10.044	0.1230

The table presents the test of adequacy of the VECM.

Table 7: Residual Analysis

### III. DISCUSSIONS OF RESULTS

Table 1 presents the results of the ADF test which revealed that the variables deposits and loans are non-stationary at levels but are stationary after differencing once indicating that they are integrated of order one.

The johansen trace test and max. Eigenvalue applied to determine the order of cointegration of the variables (loans and deposits) which forms the basis for the VECM; revealed that the variables are integrated of order one.(Table 2 ). The cointegrating coefficient is -0.94436 meaning when deposits increase loans goes down. This is undesirable but since the variables are cointegrated we can run the VEC. (Table 3)

Table 4 shows that there is bidirectional causality running from deposits to loans and loans to deposits respectively since the probability value is less than 0.05. The VECM revealed -0.512453 as the speed of adjustments towards long run which is negative and significant as required for a long run relationship; meaning deposits has long run influence on loans or a long run causality runs from deposits to loans(Table 5) but deposits has no short run causality on loans as revealed by Wald test (Table 6). The results of the residuals analysis employed to test for the adequacy of the model revealed that the model suffers from serial correlation and are not normally distributed but heteroskedastic. The serial correlation problem

was corrected using Q-statistic after adjusting for dynamic repressors (Table 7).

### IV. CONCLUSIONS

“Loans create deposits” is a phrase which is operational in endogenous money system, which good as an observation because deposits are used to repay loans.

Therefore, reference to the discussion presented in the preceding section, it is obvious that deposits cause loans likewise loans influence deposits and that a long run causality exist between deposits and loans with -0.512453 as the speed of adjustment towards long run relationship. Short run change in deposits has no influence on loans which in turn does not have any adverse effect on the economy. The following policy are recommended: commercial banks and agricultural development should be encourage to set-up structure in the rural areas so as to promote small scale enterprises; rural dwellers should be educated and motivated to make deposits with these banks so as to create a better capital base.

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